11.6.2 Test of the NSRL CO_2 Monitor System

Text Pages 2 through 3

Attachments

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: ***Signature on File*** _____
Collider-Accelerator Department Chairman Date

P. Cirnigliaro/ D. Phillips

11.6.1 Test of the NSRL CO_2 Monitor System

1. Purpose

1.1. This procedure details the process to be used to test the NSRL CO_2 Monitor System.

2. Responsibilities

2.1 The C-AD Liaison Engineer for NSRL shall have the NSRL CO_2 Monitor System tested annually.

2.2 The Technician testing the system shall record all data on the NSRL CO_2 Monitor System Record Sheet, and attach updated calibration labels obtained from the C-AD Calibration Laboratory.

2.3 The Liaison Engineer shall forward the completed NSRL CO_2 Monitor System Record Sheet to the C-AD Calibration Laboratory for entry into the calibration data base.

3. Prerequisites

3.1 Certified calibration gas of approximately 4000ppm CO_2 in Air, approximately 5% CO_2 in Air, N_2 test gas, and pressure regulators.

4. Precautions

4.1 Warn people in the area that alarms are being tested.

5. Procedures

5.1 Record the readings in air for Vulcain Units in Labs and readouts in Hall. Check that all Tower Lights are Green.

5.2 Purge each of the CO_2 Monitors with N_2 and record the readings at the Vulcain Units in the Labs and at the readouts in the Hall. To flow gases unclip the CO_2 Monitor from the base and flow gas in the back. If reading on Vulcain Unit is not less than 50 ppm follow Zero Calibration procedure from Vulcain 90DM3A User Manual. If reading on the Hall Unit is not less than 50 ppm follow 4-20 mA Calibration procedure from Vulcain 90DM3A User Manual. The password is JJ.

5.3 Flow the 4000ppm calibration gas over each of the CO_2 monitors and record the readings at the Vulcain Units in the Labs and at the readouts in the Hall. Check that all Tower Lights are Yellow and Slow Audio Alarm Sounds. Low Level Alarms should trip at 3000 ppm. Reset alarms between testing monitors. If reading on Vulcain Unit is not between 3600 ppm and 4400 ppm follow Span Calibration procedure from Vulcain 90DM3A User Manual. If reading on Hall

Unit is not between 3600 ppm and 4400 ppm follow 4-20 mA Calibration procedure from Vulcain 90DM3A User Manual. The password is JJ.

5.4 Carefully flow 5% CO_2 in air over each of the CO_2 monitors to allow the unit to trip the High Level Alarm (set at 5000ppm) between 4500ppm and 5500ppm. Check that all Tower Lights are Red and Fast Audio Alarm Sounds. Reset alarms between testing monitors.

5.5 Upon successful completion of this procedure, have the Calibration Record Sheet reviewed by the NSRL LE. After LE approval attach a new calibration label to the system. Calibration labels are available through BNL stock, stock number S-33844, or equivalent.

6. Documentation

6.1 Calibration database records shall be maintained for a minimum of three (3) years.

7. References

7.1 Vulcain model 90DM3A User Manual

8. Attachments

8.1 NSRL CO2 Monitor System Calibration Record Sheet

8.2 Vulcan model 90DM3A Calibration Procedure

8.1 NSRL CO2 Monitor System Calibration Record Sheet

Date:- _____

	C1 Lab	C2 Lab	C3 Lab	Hall
Serial Number				
Step				
5.1 Normal Reading in Air, Vulcain Units in Labs				**N/A**
5.1 Normal Readings in Air, from Hall				**N/A**
5.1 Color of Lights in Air				
5.2 N_2 Purge Reading, Vulcain Units in Labs **If readings are > 50 ppm Zero Monitors**				**N/A**
5.2 N_2 Purge Reading, from Hall **If readings are > 50 ppm Zero Monitors**				
5.2 Was Zero Calibration Required? (Y/N)				
5.2.a If zeroed N_2 Purge Reading, Vulcain Units in Labs				**N/A**
5.2.b If 4-20mA was adjusted, N_2 Purge Reading, from Hall				**N/A**
5.3 CO_2 Cal Gas Concentration _____ (use approx. 4000 ppm gas) **Cal Gas Reading Vulcain Units in Labs.** If readings are < 3600 ppm or > 4400 adjust Span				**N/A**
5.3 CO_2 Cal Gas Concentration _____ (use approx. 4000 ppm gas) **Cal Gas Reading Vulcain Units in Hall.** If readings are < 3600 ppm or > 4400 adjust Span				**N/A**
5.3.a Was Span Calibration Required? (Y/N)				
5.3.b If span was adjusted Cal Gas Reading (approx 4000 ppm) , Vulcain Units in Labs.				**N/A**

5.3.c If 4-20mA was adjusted Cal Gas Reading (approx 4000 ppm) , Units in Hall.				**N/A**
5.3.d Low Level Color of Lights				
5.3.e Low Level Slow Audio Alarm (Y/N)				
5.4 Using 5% CO_2 test High Level Trip. Are alarms between 4500 & 5500 ppm at Vulcain Unit? (Y/N)				**N/A**
5.4 High Level Color of Lights				
5.4 High Level Fast Audio Alarm				

NOTES: _____

_____

Performed by [print] _____ **Life Number** _____

Signature _____ **NSRL LE Review:**

Copy to be sent to C-AD Calibration Laboratory
Copy to be sent to C-AD ESSHQ

8.2 Vulcan model 90DM3A Calibration Procedure

SPECIFICATIONS

Power Requirement:	17-27 Vac or 24-38 Vdc, 200 mA
Gas Detected:	CO_2
Detection Range:	0-2000 PPM, 0-1% OR 0-5%
Accuracy:	± 40 ppm + 3% reading
Response Time:	<60 sec. (for 90% step change)
Sensor Life Expectancy:	> 10 years
Operating Temperature Range:	32°F to 100°F (0°C to 40°C)
Operating Humidity Range:	0% - 95% RH, Non-Condensing
Dimensions:	5.25 in (H) x 3.5 in (W) x 2.0 in (D) (11.5 cm x 7.5 cm x 4.4 cm)
Weight:	SM: 0.55 lbs (0.20 kg) DT: 0.66 lbs (0.30 kg)
Warranty:	5 year limited warranty

Optional Outputs:

1: 4-20 mA, 0-5 Vdc or 0-10 Vdc

2: 1 SPDT Relay

Relay Output Rating:	5A, 30 Vdc or 250 Vac (resistive load)
3: Display	LCD

PERIODIC INSPECTIONS AND CALIBRATION

This unit requires calibration. The calibration frequency will be a function of the operating conditions, including operating under extreme temperatures, exposure to contaminants or gas concentrations. A calibration inspection must be included as part of a routine maintenance to ensure proper operation of the gas detection unit.

If unit span or zero cannot be adjusted, the sensor may be approaching its end-of-life and must be replaced.

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CALIBRATION MENU

Password * AA *			User Password to enter the Menu.
MainProg Max Conc			Scale configuration field.
MainProg Max Conc	Max Conc 2000 ppm		Adjust the maximum scale concentration for the transmitter.
MainProg Max Conc			Alarm setting field.
MainProg Alarm A	Alarm A 850 ppm		Adjusting Alarm level.
MainProg Set 4ma			4mA setting field.
MainProg Set 4ma	Set 4ma Adj 4@20		4mA adjusting field.
MainProg Set 20ma			20mA setting field.
MainProg Set 20ma	Set 20ma Adj 4@20		20mA adjusting field.
MainProg Set Zero			Zero setting field.
MainProg Set Zero	Set Zero GO CALIB		Activate the zero calibration using nitrogen.
Main Prog Set Zero	Set Zero GO CALIB	Set Zero * Wait *	* Zero * calibration is underway.
MainProg Set Span			Calibration with the Span gas.
MainProg Set Span	Set Span 225 ppm		Adjust the Span gas value that will be used.
MainProg Set Span	Set Span 225 ppm	Set Span GO CALIB	Accept the Span value and validate.
MainProg Set Span	Set Span 225 ppm	Set Span GO CALIB	Set Span * Wait * Span is underway.
MainProg *Reset**			Resets the unit.
MainProg *Reset**	Reset * Yes *		Acknowledge if you want to reset.
MainProg * Quit *			To quit from the menu program.
MainProg * Quit *	Wait Re-init		The unit reinitializes itself once quitting the Programming Menu.